US Army Corps
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Walla Walla District

United States
Environmental Protection Agency
Region 10

DREDGED MATERIAL MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT

McNary Reservoir and Lower Snake River Reservoirs

APPENDIX J
Dredged Material Evaluation Framework

FINAL
July 2002

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13. ABSTRACT *(Maximum 200 words)*

This final Dredged Material Management Plan/Environmental Impact Statement (DMMP/EIS) presents the Corps of Engineers' programmatic plan for maintenance of the authorized navigation channel and certain publicly owned facilities in the lower Snake River reservoirs between Lewiston, Idaho and the Columbia River, and McNary reservoir on the Columbia River for 20 years; for management of dredged material from these reservoirs; and for maintenance of flow conveyance capacity at the most upstream extent of the Lower Granite reservoir for the remaining economic life of the dam and reservoir project (to year 2074). The Corps, along with the U.S. Environmental Protection Agency, analyzed four alternatives for this Final DMMP/EIS: Alternative 1 - No Action (No Change) - Maintenance Dredging With In-Water Disposal; Alternative 2 - Maintenance Dredging With In-Water Disposal to Create Fish Habitat and a 3-Foot Levee Raise; Alternative 3 - Maintenance Dredging With Upland Disposal and a 3-Foot Levee Raise; and Alternative 4 - Maintenance Dredging With Beneficial Use of Dredged Material and a 3-Foot Levee Raise (Recommended Plan/Preferred Alternative).

14. SUBJECT TERMS
dredging, dredged material, navigation maintenance, flow conveyance, inland waterway, Lower Snake River, Ice Harbor Reservoir, Lower Monumental Reservoir, Little Goose Reservoir, Lower Granite Reservoir, McNary Reservoir, Lewiston levee system

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FINAL DREDGED MATERIAL MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT
McNary Reservoir and Lower Snake River Reservoirs

JULY 2002

ERRATA SHEET
FOR
APPENDIX J - DREDGED MATERIAL EVALUATION FRAMEWORK

This appendix has not been substantially changed from the draft and will not be reprinted. Please make the following changes to the draft appendix and consider the draft appendix with corrections as the final appendix.

Front cover:
Apply the attached label (FINAL, July 2002) on the front cover to the right of the draft date.

Footnotes throughout the appendix:
Change all footnote references from "Draft DMMP/EIS, October 2001" to "Final DMMP/EIS, July 2002."

Section 1.0 Introduction
Page J-1
Add this paragraph as the initial paragraph:
The Dredged Material Evaluation Framework (DMEF): Lower Columbia River Management Area (Corps, 1998) was used as the regulatory guidance for sediment sampling and analysis completed in the summer of 2000 in areas proposed for dredging in the winter of 2002-2003. The results of the analyses and the comparison to the screening levels from the Lower Columbia DMEF are discussed in Appendix H, Water and Sediment Quality. The Lower Columbia DMEF will be used as the interim regulatory guidance for all required sampling and analysis prior to adoption of a Mid-Columbia/Lower Snake DMEF currently under development and described in the remainder of this appendix.

Section 1.0 Introduction
Page J-1, 1st paragraph
Change 2nd sentence to read:
This appendix addresses the development of a comprehensive evaluation framework governing sampling, sediment testing, and test interpretation (disposal guidelines) for determining the suitability of dredged material for unconfined aquatic disposal.

Section 5.7 Chapter 7 - Sampling
Page J-11
In 4th sentence:
Change "section 7.0" to "section 6.0."

*** * * END OF CHANGES * * ***

DREDGED MATERIAL MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT

McNARY RESERVOIR AND LOWER SNAKE RIVER RESERVOIRS

APPENDIX J

DREDGED MATERIAL EVALUATION FRAMEWORK

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October 2001

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1.0 INTRODUCTION

This appendix is an introduction and overview of the U.S. Army Corps of Engineers (Corps), Walla Walla District, Dredged Material Evaluation Framework (also referred to as the "framework") for the mid-Columbia River (MCR) and lower Snake River (LSR). This appendix addresses the development of a comprehensive evaluation framework governing sampling, sediment testing, and test interpretation (disposal guidelines) for determining the suitability of dredged material. This Framework is designed to assist implementation of regulatory controls and public accountability for disposal of sediment placed at dredged material disposal sites. It will be developed pursuant to the Clean Water Act (CWA) of 1977, as amended. The primary national guidance document was jointly prepared by the U.S. Environmental Protection Agency (EPA) and Corps, *Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. – Testing Manual*, February 1998 (referred to as the "Inland Testing Manual").

The framework planning group is to identify the most reliable, recognized, and cost-effective sampling and analysis procedures for appropriately characterizing dredged material and incorporate these procedures into this document for use by the region. Chemical and biological tests and interpretation guidelines will be described for assessing the acceptability of dredged material for unconfined aquatic disposal. Application of these tests and guidelines will also provide preliminary information on the need for other disposal or management options, such as confined aquatic, near-shore, or upland disposal.

The framework manual is to distill the accumulated knowledge and experience with dredged material management in the Pacific Northwest over the last 25 years. It is to describe stepwise procedures for dredged material evaluation and will be available for use by the regulatory community in the MCR Management Area (MCRMA) and the LSR Management Area (LSRMA). Documents containing justification for the guidelines and procedures in this framework are contained in the reference section. Full consideration will be given to all pertinent Federal and state laws, regulations, and guidance, including other regional dredged material management programs. The framework is to be consistent with the guidelines of the national-level manual.

The goal of the manual is to provide the basis for acceptable and appropriate guidelines governing environmentally safe, unconfined aquatic disposal of dredged material, thereby improving consistency and predictability in dredged material management. The establishment of evaluation procedures will assist in the continued operation and maintenance of navigation facilities in the region, minimize delays in scheduled maintenance dredging, and reduce uncertainties in regulatory activities. The framework guidelines are designed to ensure consistency in evaluations between Corps and non-Corps dredging projects.

The development of a dredged material evaluation framework for the MCR and LSR will be a cooperative interagency/intergovernmental program established by the Corps; EPA; Washington Department of Ecology (WDOE); Washington Department of Natural Resources (DNR); Oregon Department of Environmental Quality (ODEQ); Idaho Department of Environmental Quality (IDEQ); and the Nez Perce Tribe Water Resources Division (NPTWRD), as principal participants. These seven entities have regulatory, proprietary, or treaty responsibilities for

dredged material evaluation and disposal in the region, and constitute the Regional Dredging Team (RDT). The MCR and LSR Dredged Material Evaluation Framework represents an expansion toward a broader dredged material management program throughout the region. The procedures used in development of the manual will be derived from, and inspired by, similar regional programs, including the successful Puget Sound Dredged Disposal Analysis (PSDDA) Program for the Puget Sound region of the State of Washington, the Grays Harbor/Willapa Bay *Dredged Material Evaluation Procedures Manual*, the *Lower Columbia River Management Area Framework*, and Corps, Portland District, Dredged Material Tiered Testing Procedures.

2.0 PRIMARY OBJECTIVES

2.1 Objective 1

The first objective is to establish a uniform framework for evaluating sediment quality for unconfined aquatic disposal in the MCR and LSR.

The MCR and LSR are contiguous tri-state inland water bodies lying within Idaho, Oregon, and Washington. Dredging and aquatic dredged material disposal occur on the Oregon and Washington sides of the river. Dredging may also affect waters of interest to local tribes. Projects may involve dredging in one state with disposal in the other state. Because dredging, disposals, and associated impacts could affect all three states and the tribes, regulation of these activities should be consistent.

States have statutory control over water quality impacts resulting from a neighboring state. Section 401 (a)(2) of the CWA requires that a neighboring state be notified of actions that may affect its water quality. In order to work efficiently under this regulation, water quality evaluations in a tri-state waterway should be consistent. Without uniform evaluation criteria, the implementation of water quality programs in shared water bodies may not be consistent or predictable. Section 103 of the CWA encourages states to develop uniform laws for the prevention, reduction, and elimination of pollution and to negotiate and enter into agreements or compacts not contrary to any laws or treaties of the United States.

2.2 Objective 2

The second objective is to establish a uniform framework that the Corps will use as guidance to carry out requirements in conducting the dredging and disposal program for the MCR and LSR. The laws and regulations under which the Corps operates require the Corps, to the maximum extent practicable, to predict dredged material types, contaminant levels, and biological effects, both in water and sediments, before dredging and disposal actions can be considered environmentally acceptable.

This framework is designed to encourage a cooperative effort involving WDOE, DNR, ODEQ, EPA, IDEQ, NPTWRD, Corps, and other interested parties.

2.3 Objective 3

The third objective is to establish an appropriate sediment characterization framework agreeable to the public, stakeholders, and resource agencies.

This framework is to work toward establishing sediment sampling and testing procedures acceptable to stakeholders, such as ports and private industries that maintain navigation access in the study area, and resource agencies having an interest in, concern for, or some form of permit authority in the MCR and LSR areas. These are resource agencies that have not participated in the development of the framework but have expertise related to the natural resource values of the river. Such a framework is to provide clarity, maximize consistency, and allow informed discussions to take place on the need for and extent of sediment characterization for dredging projects.

2.4 Objective 4

This objective is to establish use of the regional database to track the long-term trends in sediment quality of specific dredging projects/locations and the river in general.

The management of the dredging and disposal program requires the collection and maintenance of data for projects and their characteristics. The Dredged Material Management Plan (DMMP) includes plans and alternatives developed to address the future needs and availability of disposal sites. Implementation of this framework should facilitate regular sediment quality reporting in the study area and thus raise the information level available to the Corps and resource agencies when evaluating dredging and disposal.

3.0 EVALUATION FRAMEWORK

The evaluation procedures consist of sampling requirements, tests, and guidelines for test interpretation (i.e., disposal guidelines) used in assessing the quality of dredged material and its acceptability for disposal. Evaluation procedures should assist in identification of unacceptable adverse effects on biological resources or human health that might result from dredged material disposal. The acceptability of material for disposal can be determined from the test results. This evaluation is to define the minimum criteria for evaluating dredged material under the CWA. For example, in the implementing regulation, the maximum volume of dredged material that can be represented by a single sample or by a single analysis is defined for different categories of material. Application of this criteria to a proposed volume of sediment means that a minimum number of samples or analyses must be conducted and fewer than that number are insufficient for agency decision making.

As previously noted, the manual will primarily address aquatic disposal issues. However, the broad concept of evaluation goes beyond open-water disposal to include such alternatives as upland, near-shore, and confined aquatic disposal. Depending on the specific circumstances, these disposal options may be characterized as beneficial uses of dredged material. From a regional perspective, the Corps has relied upon open-water disposal to a considerable extent, particularly in recent years. This is due, in part, to a collective desire to dispose of material in the

most economical fashion that is still within the range of environmentally acceptable practices. With few exceptions, sediments in the region have been deemed suitable for unconfined aquatic disposal. It is recognized that regional evaluation procedures applicable to upland, near-shore, and confined disposal, particularly as related to contaminated sediments, also need to be established. The necessity for doing so is recognized and efforts are underway to set these procedures in place.

Dredged material containing unacceptable chemical concentrations that could result in adverse effects would be placed in a confined disposal site (i.e., upland). Potential effects are determined by conducting chemical and biological tests on the sediment prior to dredging. Material that is found to be unacceptable for unconfined aquatic disposal may or may not be acceptable for conventional upland/near-shore disposal because of differing behavior of chemicals in upland and near-shore disposal environments. As a result, testing for disposal at upland and near-shore sites could differ from that for disposal in water, and test results for one environment are not directly transferable to the other.

Although several options may be feasible, not all those confined disposal options may be available to every dredging project in this region. Additionally, confined disposal decisions will often revolve around the advantages and disadvantages of specific sites (e.g., proximity to resources). Besides availability and siting, the issues of cost and the necessary degree of chemical isolation must be considered. The joint EPA/Corps manual *Technical Framework for Dredged Material Management* (1992) provides a framework for the full continuum of management alternatives and will be consulted for options whenever material is found unsuitable for unconfined aquatic disposal.

It must also be noted that the Corps' dredged material management actions occur exclusively in freshwaters. The body of knowledge concerning the establishment of freshwater criteria or codified sediment quality standards needs supplementation to complete the objectives of this framework group. To this end, it is recommended that sublethal bioassays to establish local sediment quality guidelines be conducted.

Dr. David Bennett wrote extensively on the beneficial uses of the dredged material as building material for construction of juvenile salmon habitat (Bennett et al., 1995). The evaluation framework will also contain procedures for the evaluation process used to determine beneficial uses. There will be an outline of the testing procedures and some of the monitoring practices to assess the cost versus benefits gained from these dredging and disposal operations. During the life of this manual, it will be necessary to update those chapters concerned with beneficial use as new information is gained.

4.0 FRAMEWORK CHARACTERISTICS

Evaluation procedures comprise the process of dredged material assessment and incorporate a range of scientific and administrative factors. The dredged material evaluation on avoiding unacceptable adverse biological effects should have certain characteristics. The following nine characteristics are inherent in the evaluation process:

- **Consistent** – Evaluation procedures must be applicable on a uniform basis regardless of project or site variability.

- **Flexible** – Evaluation procedures must be flexible enough to allow for exceptions due to project and site-specific concerns and be adaptable to projects of any size.

- **Accountable** – The need for, and cost implications of, evaluation procedures must be justifiable to the individual permittee and to the public.

- **Cost Effective** – Evaluation procedures must be timely and cost effective.

- **Objective** – Evaluation procedures are clearly stated, logical, and must be applicable in an objective manner.

- **Revisable** – Evaluation procedures are based upon best available technical and policy information and will be revised periodically to incorporate new information and management decisions.

- **Understandable** – Evaluation procedures must be clear and concise.

- **Technically Sound** – Evaluation procedures must be reproducible, have adequate quality assurance and quality control guidelines, and generally have standardized protocols.

- **Verifiable** – The implementation of the evaluation procedures must be verifiable. One means of judging effectiveness is monitoring at a disposal site.

Regulatory consistency is important to the regulated community and local government agencies, and is needed to obtain public acceptance. Though consistent evaluation procedures may somewhat reduce flexibility, they could achieve consistency among the various regulatory agencies and allow the transfer of knowledge as staffs change. The approach used is to compile the "best judgment" of professionals currently involved in dredged material management in the region and nationally and build a consensus for the procedures and guidelines presented in this framework manual.

Although consistency is an important objective, it is recognized that flexibility must be maintained in the way the evaluation procedures and disposal guidelines are applied. When project-specific technical indications warrant, suitability evaluations or determinations, which deviate from those indicated by the guidelines presented in this manual, may be made. Consequently, professional judgment is essential in conducting project-specific evaluations. The evaluation procedures (including the disposal guidelines) require full consideration of all pertinent project factors. The guidelines are expected to be used in the majority of cases. Rather than integrating flexibility into the guideline statements (by showing ranges of values or by using terms such as "may do"), deviations from the guidelines should be limited to appropriate technical rationale and documentation, when such rationale warrants a different conclusion.

Further, this deviation approach should only be used where applicable Federal and/or state law does not otherwise preclude its application.

A good example of how flexibility enters into the evaluation procedures is the use of statistics and professional judgment in data interpretation. Statistics are primarily applied in the initial data analysis stage of the disposal guidelines. Statistical significance is used to determine if observed differences are "potentially real" when natural variability of the parameters being measured is considered. Ultimate data interpretation requires judgment on the part of a professional who is intimately familiar with the testing procedures, the project specifics, and the initial data analysis conclusions.

Analysis of data consists of a comparison to guideline values that are developed using statistical significance as a clear indicator of toxicity. However, ecological significance cannot be determined by this process. Determination of ecological significance requires both an understanding of the data and evaluation procedures and evaluation of those test results based on best professional judgment. In addition to data analysis and interpretation, evaluations on the acceptability of material for unconfined aquatic disposal may be further influenced by administrative considerations of factors such as magnitude of the proposed discharge, the degree of environmental risk that the discharge may present, and other project-specific features.

5.0 OUTLINE OF THE DREDGED MATERIAL EVALUATION FRAMEWORK

5.1 Chapter 1 - Goals, Description, and Organization

This chapter will be very similar to the Dredged Material Evaluation Framework: Lower Columbia River Management Area. Because there is a need for consistency and flexibility, every attempt will be made to coordinate the activities of this framework with other districts in the region. This chapter will also contain many new definitions and acronyms not previously published in other frameworks and some specific to the freshwater environment.

5.2 Chapter 2 - Dredged Material Management Regulation

This chapter will greatly expand the Dredged Material Evaluation Framework: Lower Columbia River Management Area. The primary reason for the expansion is this framework will encompass regulations of three states. This chapter will be exclusively freshwater oriented. It is anticipated that there will be an enhanced base of freshwater testing procedures and data interpretation methods.

5.3 Chapter 3 - Lower Snake and Mid-Columbia River Management Areas

This framework will define two distinct management areas. The MCRMA encompasses the area between McNary Lock and Dam and the Hanford Reach below Priest Rapids Dam. The LSRMA encompasses the area from the confluence with the Columbia River, the four LSR dams, the Lower Granite Lock and Dam pool navigable waters, and the lower navigable portion of the Clearwater River in Idaho. The combined management areas contain a total of

17 submanagement areas. The MCRMA encompasses SMA's 1 through 7 and the LSRMA encompasses SMA's 8 through 17.

Additionally, chapter 3 will contain a description of the summarized sediment quality for each of the management areas. The specific region this framework characterizes is comprised of diverse substrate and chemical composition. Chemical generalizations for these management areas may include: high levels of organic carbon; some metals; near detection limit of 1,1-dichloro-2,2-bis-p-chlorophenyl-trichloroethane (DDT); 1,1-dichloro-2,2-bis(4-chlorophenyl)-ethylene (DDE); and glyphosate; dioxin; and other agro-chemicals that were detected. No evidence of polychlorinated biphenyl's (PCB's) and chemicals associated with industry were detected in studies as of this date. This chapter will also contain information on dredge history and descriptions of relevant material evaluation experiences from past endeavors.

5.4 Chapter 4 - Regulatory Processes

This chapter summarizes the state and Federal regulatory processes for obtaining approval of dredging projects undertaken in MCRMA and LSRMA. Distinctions are made among the following three processes:

- The overall permit process for new dredging.
- The verification or renewal of approval for ongoing maintenance dredging work.
- The dredged material evaluation process that is integrated into the other two processes and submittal of a Dredging Quality Control Plan, which constitutes the last step before starting dredging.

Included in this chapter is a description of the Corps' role in carrying out congressionally authorized dredging projects in the LCRMA. Also included in the description is the role of the two other Corps district offices, Seattle and Portland, who share the workload for issuing permits for dredging projects in Washington and Oregon. The final portion of this chapter contains a description of the roles of the RDT, the Corps Northwestern Division office, and EPA in the dredge management process.

5.5 Chapter 5 - Tiered Evaluation Process

Some of the volume of sediment dredged annually in the two management areas and adjacent channel reaches has been found to be suitable for placement at habitat construction sites. However, the potential exists for various degrees of sediment contamination at some dredging sites. Projects locations with potential for contaminants may have to undergo a more extensive sediment evaluation.

The chemical and biological testing required under this guidance manual can be expensive. The basic framework for evaluating dredging and disposal proposals consists of a tiered evaluation process. The tiers or categories of information/data described below are used in a sequential manner for evaluating the sediments of the proposed project dredging and disposal.

This sequential approach is called a tiered evaluation process. At each tier, a suitability determination is made regarding the adequacy of the existing data. If the existing data are adequate for evaluation purposes, then there is no need to proceed to the next tier. If not, data at the next tier may be required. Most data for upland disposal may be obtained in Tier I; however, Tier IIA and beyond may be needed. The tiered arrangement is summarized as follows:

5.5.1 Tier I

Applicant and agencies compile and evaluate existing information on a specific dredging site, determine if exclusion-from-testing or recency/frequency guidelines apply, and determine if there exists a reason-to-believe that significant contamination is present. Agencies prepare a suitability determination if sufficient information is available to evaluate the proposed project dredging and disposal methods. If sediment information is not adequate, applicant must prepare and submit a sampling and analysis plan (SAP).

5.5.2 Tier IIA

Sediments could be sampled and analyzed for grain size and total volatile solids (TVS) and any other conventional chemical parameter determined applicable to the proposed dredging location. If the results of grain size analysis are at least 80 percent sand and TVS is less than 5 percent, the proposed dredged material qualifies for aquatic disposal based on exclusionary status.

5.5.3 Tier IIB

If the sediment fails either the grain size or TVS test, or if active sources of contamination are determined to be present, the sediment should be tested for chemicals-of-concern. If the results of sediment testing do not exceed screening level guidelines, the proposed dredged material qualifies for unconfined aquatic disposal. Where applicable, the use of rat hepatoma cell dioxin screening plates will be used to screen for dioxin compounds adjacent to locations with potential for contaminants.

5.5.4 Tier IIC

Total organic carbon (TOC) testing could be needed on all detects for the appropriated organic compounds (not for metals). For positive detects with the dioxin screening plate, the appropriate EPA method could be performed as a confirmatory test for 2,3,7,8-tetrachlorodibenzo-p-dioxin (2378-TCDD) and other toxic congeners.

5.5.5 Tier III

If the results of the chemistry test exceed screening guidelines, the sediment should undergo appropriate biological tests. If the sediment passes the biological testing guidelines, the proposed dredged material qualifies for unconfined aquatic disposal. Sediment that fails the biological tests of Tier III is determined to be unsuitable for unconfined aquatic disposal.

5.5.6 Tier IV

Either of the following circumstances can trigger a Tier IV evaluation:

- The results of Tier III bioaccumulation tests are indeterminate, or

- The sediments contain chemicals that do not have threshold sediment quality values or the routine biological tests are inappropriate. If Tier IV testing is considered necessary by the RDT, then specific tests or evaluations and interpretive criteria will be designed by the RDT in coordination with the project proponent.

5.6 Chapter 6 - Sampling and Analysis Plans (SAP)

This chapter covers the development of a SAP by the dredging proponent as the next step in the tiered evaluation process for those projects found to require additional information following review under Tier I. This manual will include guidelines that take into account the fact that the MCRMA is a very dynamic river system that directly connects to the LSRMA. A sampling plan serves as the main source of information about a proposed dredging project and the project site. A SAP should contain the following general categories of information in as much detail as possible. Some of these categories of information are further described in subsequent sections of this chapter. At a minimum, the SAP will contain information described beginning in section 5.6.1.

This chapter will also describe the process for ranking and determining the dredged material management units (DMMU). This is important in determining the minimum recommended testing requirements and is used as a system for ranking areas. This section will also provide preliminary information on initial ranking of the DMMU's in the two management areas.

5.6.1 Tier I Information

- Site history
- Current site use
- Identification of potential sources of contamination
- Past permitting
- Present rank.

Rank affects the number of sediment samples and analyses required from the project. More than one rank could be assigned to a single project depending upon the size of the proposed dredging area and the distribution of potential contaminant sources.

5.6.2 Project Description

- Plan view of the site
- One or more cross-sections of the dredging prism
- Type and volume of sediment to be dredged

Dredged material volume is another factor that affects the number of sediment samples and analyses required of a dredging project. This proposed dredging plan should contain such information as the depth and physical nature of the sediment, side slope and over-depth dredging, practicable widths and depths of dredging, and available dredging methods and equipment.

5.6.3 Computation of Sampling and Analysis

- Project rank and volume of dredged material
- Development of a proposed dredging plan
- Identification of dredged material management units
- Allocation of field samples
- Development of a sediment composite plan

5.6.4 Sampling Procedures

- Field sampling schedule
- Sampling technology
- Positioning methodology
- Decontamination of equipment
- Sample collection and handling protocols
- Core logging
- Sample extrusion
- Sample compositing and subsampling
- Sample transport and chain of custody

5.6.5 Physical and Chemical Testing

- Grain-size analysis
- Sediment conventionals
- Chemicals-of-concern
- Extraction/digestion methods
- Analysis methods
- Holding time
- Quality assurance

5.6.6 Biological Testing

- Holding time
- Proposed testing sequence
- Bioassay protocols
- Quality assurance

5.6.7 Personnel Responsibilities

- Individual roles and responsibilities
- Project planning and coordination
- Field sampling
- Chemical and biological testing
- Quality assurance/quality control management
- Final report preparation

5.6.8 Reports

- Sample Analysis Plan (SAP) prepared
- Comments or concerns by agencies addressed in final SAP
- Results of sampling and analyses written up in standard format and submitted to DMMO/DMMT for review by the RDT

5.7 Chapter 7 - Sampling

This chapter discusses the recommended procedures for sample acquisition and handling. This is the first step in the quality assurance, quality control process that is needed to guarantee reliable data for dredged material evaluation. A number of regional programs have developed standard sampling protocols. This chapter and the associated appendixes (see section 7.0) provide an overview of these widely accepted practices. Presampling bathymetric surveys should be conducted to provide information on current shoaling patterns and volumes of sediment present at the time of sampling. The timing of sampling should be coordinated with the DMMO/DMMT. If sampling and analysis are required for a project, the applicant will be required to sample the sediment for chemical, and if necessary, biological analyses. This chapter will also contain information about setting up laboratory analysis and requirements for data quality objectives.

5.8 Chapter 8 - Tier II Physical and Chemical Testing

This chapter describes procedures used in Tiers IIA, IIB, and IIC. These are subtiers that may be pursued individually. Tier IIA involves two conventional tests: grain size and TVS. The term conventionals refers to a group of physical and chemical parameters often measured to aid in the interpretation of chemical and biological test results. Tier IIB involves a more complex combination of physical and chemical tests that measure concentrations of individual or groups of chemicals specified for the project or project area. Tier IIC involves confirmatory results for dioxin and TOC analysis and computations. Following testing, the results of the analysis for each dredged material management unit is compared to the appropriate evaluation guidelines. Determinations are then made concerning whether the sediment is suitable for unconfined aquatic disposal or whether further testing is required (Tier III or Tier IV).

5.9 Chapter 9 - Tier III Biological Testing

This chapter describes the biological testing procedures required under Tier III. Biological effects tests may be necessary if Tier I or Tier II evaluations indicate that the dredged material contains contaminant concentrations that may be harmful to aquatic organisms. Tier III biological testing of dredged material will be required when chemical testing results exceed guideline values. A standard suite of bioassays is used to determine the suitability of the dredged material for aquatic disposal. Tests involving whole sediment determine the potential effects for bottom-dwelling organisms. Tests using suspension/elutriates of dredged material are used to assess the potential effects on water column organisms. A bioaccumulation test is required when certain chemicals of concern are detected at concentrations that may pose a potential risk to human health or ecological health in the aquatic environment.

5.10 Chapter 10 - Tier IV Evaluations

This chapter describes the methods and procedures for the evaluation of material under Tier IV levels. A Tier IV evaluation is a special, nonroutine evaluation that is coordinated with the RDT and the dredging proponent to determine the specific testing required. As part of this ongoing process, the RDT will continually review new tests and evaluation procedures that have been peer reviewed and are deemed ready for use in the regulatory evaluation of dredged material. The RDT will subsequently make recommendations about their potential implementation and use. Tier II and III evaluations of dredged material may lead to conducting Tier IV evaluations.

Three circumstances are expected to trigger Tier IV evaluations: (1) the results of Tier III bioaccumulation tests (tissue analysis) are indeterminate, (2) the sediments/tissues contain chemicals for which threshold values have not been established, or (3) the routine Tier III biological tests are inappropriate. If Tier IV testing or evaluations are determined necessary, specific tests or evaluations and interpretive criteria will be specified in coordination with the RDT. Alternative analyses that may be conducted in this tier may include any or all of the following:

5.11 Chapter 11 - Data Management and Analysis

This chapter outlines the methods of compiling the data obtained from a qualified sampling and testing effort. The chapter will cover the following categories of information:

- A sediment characterization report, which includes the items described below.
- Biological and chemical data in the format required for inclusion in the regional database.
- The sampling and testing costs. This information is optional, but it allows the agencies to track program expenditures and assess the economic impacts of the program. This data is vital in tracking trends in costs and will provide dredging proponents with information useful in planning future dredging. The Corps will include cost information in their reports summarizing the annual dredging done in the management areas.

5.12 Chapter 12 - Beneficial Use Evaluation

This chapter will specifically deal with the testing and evaluation of the data gained during the tiered process that will be used as an evaluation tool for determining beneficial uses. Special tests will be based on the beneficial use of dredged material. There are specific differences in tests that determine a beneficial use on land or in water. Also included in this chapter is a process and methodology to assess the cost-to-benefit ratio for the creation of underwater habitat. This chapter will discuss the minimum monitoring requirements and evaluation process for determining if future beneficial use is justified.

6.0 APPENDIXES

The following is a preliminary list of appendixes that the Corps plans to include in the final Dredged Material Evaluation Framework: Mid-Columbia River and Lower Snake River.

A. Hydrologic Analysis
B. Current Sediment Management Unit Ranking
C. Sediment Sampler Techniques
D. Up-land Disposal Requirements
E. Sample of an SAP for Small Projects
F. Sample of an SAP for Large Projects
G. Federal Guidelines for the 404(b)(1)
H. Preparation of 404(b)(1) Examples and Tips
I. Ambient Water Quality Descriptions
J. Sediment and Water Quality Monitoring
K. Estimating Costs for Sample and Analysis
L. Current Recommended Screening and Maximum Thresholds
M. Quality Control and Quality Assurance
N. Current Test Methods
O. Record of Revisions, Inclusions, Changes, and Errata

7.0 REFERENCES

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